**A.P. Calculus Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Worksheet – Velocity, Distance, and the trapezoid Rule Due Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

This activity should be completed in groups of three. The job of each person is as follows:

1. **Driver** – drives (legally) the car wherever and however he/she desires but must drive for 15 minutes. (Reset the trip odometer before you start!)
2. **Timer** – keeps track of the time the car has been driven and says “time” at the end of one minute, two minutes, three minutes, etc. up to fifteen minutes.
3. **Recorder** – records the velocity of the car and the distance that the car has traveled from the starting point every minute of the trip. Record the distance to the nearest tenth of a mile.

After finishing the trip, each member of the group should fill in the chart below, then complete the exercise (on E-2 paper).

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Distance | Velocity  (miles/hour) | Velocity  (miles/minute) |
| 0 |  |  |  |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Distance | Velocity  (miles/hour) | Velocity  (miles/minute) |
| 8 |  |  |  |
| 9 |  |  |  |
| 10 |  |  |  |
| 11 |  |  |  |
| 12 |  |  |  |
| 13 |  |  |  |
| 14 |  |  |  |
| 15 |  |  |  |

Exercise:

1. Construct a **scatterplot**, on paper, that shows the points representing the ordered pairs: **(time, miles/minutes**)

2. Connect the data points with line segments creating trapezoids.

3. Using unit analysis, tell why the sum of the area of these trapezoids represents the approximate distance that was traveled in the 15 minute trip.

4. Find, approximately, the distance traveled between t = 0 and t = 15 by finding the sum of the areas of the trapezoids. How does this result compare to the total distance traveled that was recorded in your chart?

5. What could you have doe to get a more accurate approximation for the total distance traveled?

6. Using your distance column of the chart, not the velocity column, what was your average velocity during the 15 minute trip? Were there any times during the trip that you were traveling exactly this velocity? Explain.

7. Using your distance column of the chart, not the velocity column, what was your average velocity during the last 5 minutes of the 15 minute trip? Were there any times during the trip that you were traveling exactly this velocity? Explain.